REMARKS

This is in response to the Office Action of 24 February 2004. Claims 1-7 and 13-17 are pending in the application, and Claims 1-7 and 13-17 have been rejected.

By this response and amendment, arguments are presented that traverse the rejections and request that they be withdrawn; and Claim 1 is amended in a non-narrowing manner to add the word "the" before "first device".

No new matter has been added.

In view of the remarks below, Applicant respectfully requests reconsideration and further examination.

About The Invention

The present invention relates generally to apparatus and methods for packaging multiple integrated circuits that operate at different voltages in a single package. In a particular embodiment, a ball-grid array (BGA) package, which includes multiple layers of conductors separated by dielectric layers, is arranged such that the power planes, ground planes, and connection balls associated with each of at least two integrated circuits are separated from each other by at least a distance that is based upon the difference in operating voltages between the integrated circuits.

Non-narrowing Amendment of Claim 1

To improve the grammar and readability of Claim 1, Applicant has amended the last subparagraph of Claim 1 to include the word "the" prior to "first device". Applicants respectfully assert that this amendment does not raise any new issues, nor require any additional searching, and therefore requests the Examiner to enter this amendment.

Appl. No. 10/024,936

Rejections under 35 USC 103(a)

Claims 1-7 and 13-17 have been rejected under 35 USC 103(a) as being unpatentable over Koepf (US Patent 5,138,436) in view of Cadence (Allegro Designer/Allegro Expert).

Applicants respectfully traverse the rejection of Claims 1-7 and 13-17 under 35 USC 103(a), and request that these rejections be withdrawn.

The Examiner states that Koepf is silent about separating electrically isolated sections by a first distance based upon an expected Voltage difference, and further states that the Cadence reference teaches voltage dependent spacing for BGA package construction.

The entire Cadence reference has been carefully reviewed, and Applicants respectfully submit that there is no such teaching in this cited reference. There is a mention of a BGA package in this reference in connection with a graphical wizard facility in the Cadence software that is intended to provide greater ease of use for designers. The actual sentence is:

> "Allegro's IntelliUSE employs an innovative graphical wizard to help streamline and simplify many complex procedures, such as multilayer padstack design, BGA package construction, user environment variable settings and design rule error location and debug."

Applicants respectfully assert that this disclosure, whether taken alone or in combination with Koepf, simply does not produce the invention defined by Applicants' Claims, wherein a package has a number of conductors, with the various ones of the conductors segregated into different sections, and those sections are spaced apart a distance based on an expected difference in operating voltage in those sections.

Furthermore, the only mention of voltage dependent spacings in the Cadence reference is in connection with that portion of the software tool suite

that routes signal lines, i.e., interconnect paths. More particularly, the Cadence reference, in connection with the push/shove router, discloses only that a path can be routed such that obstacles are pushed aside from the interconnect path, or that the interconnect path is made to contour follow other interconnect as a priority and only pushes aside or jumps obstacles when it has no other choice. The actual sentence is:

> "The shape-based, push-and-shove capability follows all complex rules regarding line widths and voltage-dependent spacings."

Applicants respectfully assert that this disclosure, whether taken alone or in combination with Koepf, does not produce the invention defined by Applicants' Claims. Applicants do not simply claim two conductors in a BGA package that are spaced apart from each other. Applicants' independent Claim 1 is clearly directed to packages in which a first and a second set of external electrical connection contacts are segregated into a respective first and a second section, and those sections, containing the external electrical connection contacts, are separated from each other by at least a distance that is based on the difference in operating voltage of electrical devices connected to those sets of external electrical contacts. Similarly, Applicants' independent Claim 13 is directed to packages in which each of a plurality of layers includes a plurality of sets of electrical conductors that are segregated into a corresponding plurality of electrically isolated sections, with the sections being separated by a minimum distance based on an expected voltage difference between the sets of electrical conductors.

In view of the foregoing it can be seen that the combination of Koepf and Cadence does not disclose, suggest, or provide motivation for the arrangement of conductive elements in packages as set forth in Applicants' Claims.

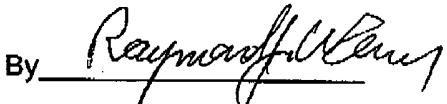
For at least the reasons set forth above, Applicants respectfully submit that the rejections of Claims 1-7 and 13-17 under 35 USC 103(a) should be withdrawn.

Conclusion

All of the rejections in the outstanding Office Action of 24 February 2004 have been responded to, and Applicant respectfully submits that the pending Claims 1-7 and 13-17 are now in condition for allowance.

Applicants respectfully request that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

By 

Raymond J. Werner
Reg. No. 34,752

Dated: 14 April 2004
Portland, Oregon